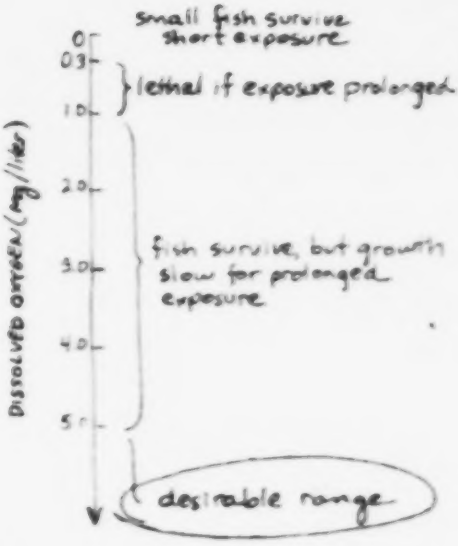
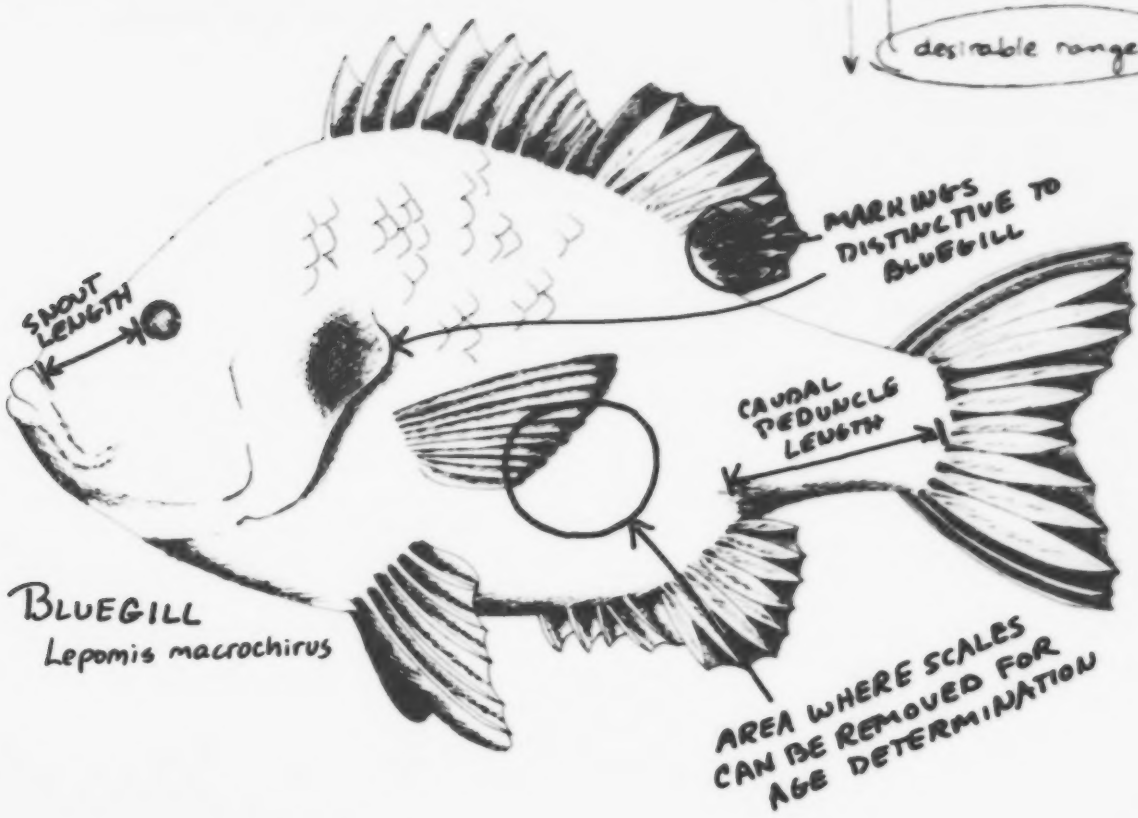
990-91

FISHERIES ACADEMY

Fish and Wildlife Service
U.S. Department of the Interior



$$\text{Ammonia Factor} = \frac{\text{ppm total ammonia} \times \text{gpm water inflow}}{\text{lbs food fed per day}}$$



1990-91 Course Catalog

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John F. Turner
Director
U.S. Fish and Wildlife Service

Training represents not only an opportunity for personal growth and achievement, but the chance to make a greater contribution to your fellow citizens and the resources they value.

For more than 40 years, the Fisheries Academy and its predecessor training schools sponsored by the U.S. Fish and Wildlife Service have afforded thousands of fishery biologists and other resource specialists a diversity of learning opportunities. Indeed, students from all over the world have sought out the specialized courses in management and aquaculture techniques designed to improve the health and abundance of aquatic resources.

Nineteen-ninety marks an important transition year for the Fisheries Academy. It will now be administered by the Service's new Office of Training and Education, and by 1995 the Academy will be housed at the Fish and Wildlife Service's new national training facility located in Harpers Ferry, West Virginia. While its location and structure will be new, the Fisheries Academy will continue to represent, through its staff, students and commitment to quality, the long standing traditions of academic excellence and unstinting dedication to conserving our aquatic resources.

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The Fisheries Academy

Located 70 miles northwest of Washington, DC in Leetown, West Virginia, the Fisheries Academy offers courses to supplement and extend the experiences of people involved in fisheries management and aquaculture. Fisheries Academy courses are designed not only for people responsible for the day to day operation of fish production facilities, but also for those responsible for management. The Academy's instructors include world-known authorities in fish husbandry and production techniques, fish diseases, genetics, and aquaculture.

A new training thrust has begun within the U.S. Fish and Wildlife Service with the establishment of an Office of Training and Education. This office will promote the development of natural resource professionals through training and educate the public in the principles of natural resource management. With the start of the new fiscal year, the Fisheries Academy will be absorbed into the new organization. This union will provide greater opportunities for growth and development through a much broader spectrum of training programs.

In today's technological society and with an increased need for people who are good managers as well as biologists, continuing education has become increasingly important. The Fisheries Academy provides a way for fisheries biologists, managers, and people working in the aquaculture industry to develop the necessary basic skills, keep abreast of the latest developments and technologies, and develop new skills in fisheries techniques and management.

The Fisheries Academy

Fisheries Training Programs

The following information describes the variety of training opportunities available to Fish and Wildlife employees. Although a few of the courses are limited to Service employees, most of them are open to all professional and/or technical personnel regardless of their employing organization.

Orientation (new employees)

The Fish and Wildlife Service's orientation program consists of three parts. Upon entry into the Service, employees receive an employee handbook that describes many of the basic policies of the Federal Government and the Service. A video-tape is available to describe the mission of the various organizational entities within the Service. In addition, each Regional Office is asked to conduct a two day orientation course each year.

Entry Level (new employees)

These two courses are meant to be completed by employees during their first or second year of permanent employment.

"Introduction to U.S. Fish and Wildlife Service Fisheries Programs"
This course is designed to introduce employees to the Service's fisheries programs. Topics include the philosophy behind the Federal role in fisheries management, the organization and responsibilities of the various offices, basic legislative authorities, the budget process, the National Fish Hatchery Program, the Fish and Wildlife Assistance Program, computer applications, safety and career development. Trainees will be introduced to key personnel within the Fish and Wildlife Service, as well as encouraged to develop a network of relationships among themselves. Emphasis is placed on providing a broad understanding of the functions and responsibilities of all the offices in Fisheries.

"U.S. Fish and Wildlife Service Fisheries Operations"
This course is designed to provide an in-depth look at the Fisheries Program in the Fish and Wildlife Service. The "Statement of Responsibilities and Role" along with other policy guidelines will be used as a guideline for understanding the National Fish Hatchery Program, the Fish Health Management Program, and the Fish and Wildlife Assistance Program. Trainees will be introduced to management plans and be given the opportunity to develop a plan in which they must consider hatchery production, fish disease problems and native stock protection. The course emphasizes the integration of the entire fishery resource and the necessity for cooperation between the various fisheries functions in order to achieve success.

Technical Skills Development (GS-7/9/11/12)

Technical skills development training courses are designed to fulfill two job performance needs--developing basic skills and gaining knowledge of new technology. Employees moving into positions for which they need to acquire new skills and employees whose understanding of an acquired skill needs to be brought up-to-date are the target audience. The majority of Fisheries Academy courses fall into this category. Mid-level fisheries biologists in the Fish and Wildlife Service are expected to attend 40 hours of training at least once every three years.

Fish Health Management and Disease Diagnosis (GS-9/11)

This special long term training course is offered in cooperation with the Fish Health Research Laboratory at Leetown, West Virginia. It is used to train experienced hatchery personnel for positions as fish health specialists in the hatchery system. The course is offered periodically to meet expressed workforce requirements within the Service. Individuals aspiring to embark on a career in fish health management should prepare themselves for the course by taking graduate or undergraduate courses in subjects such as parasitology, bacteriology, immunology, virology, and fish physiology.

Supervisory and Managerial Courses (GS-9/12)

As fisheries personnel gain experience and confidence, they frequently move into supervisor or manager positions and require a whole new set of knowledges, skills, and abilities. There are hundreds of courses offered by universities, private firms, and the government that are designed to address these requirements. For additional information, consult your supervisor and/or your Regional Personnel Office.

Senior Skills Development Courses (GS/GM-13-15)

These courses are designed to provide the biological, cultural, economic, and political knowledge necessary to make decisions that affect fish and wildlife policy. These courses are offered by the Academy.

Mid-Level-Manager Development Program (GS/GM-12/13)

This two week program, offered annually, addresses manager effectiveness characteristics and management functions. It provides an intermediate level of supervisory training which relates to current Service programs and concerns.

Upper Level Management Development Program (GS/GM-12-14)

Five very important effectiveness characteristics, which have been shown to be weak in Fish and Wildlife Service managers, are the focus of this five week training opportunity. A follow up 30 to 45 day special assignment is part of the program. The course is spread over a 5 or 6 month period.

Departmental Manager Development Program (GS/GM-12-14)

This ten month program begins in Washington, D.C., with Service and Department orientation in August of each year. Rotational work assignments, management training courses, natural resource training courses, meetings and seminars are all custom designed to broaden and sharpen the managerial skills of the participants. Employees are detailed to the Washington Office for this intensive program.

Other Opportunities (all grades)

There are literally thousands of other training opportunities available, ranging from one day computer software courses to long term academic programs at major universities. For information on these courses, consult your supervisor.

Fisheries Academy Courses

The courses in this catalog will be offered by the Fisheries Academy from October 1990 through September 1991. They are open to individuals from the Federal government, state governments, conservation groups, and private businesses.

Courses that are offered by the Academy, but which do not appear in this year's schedule, are briefly described beginning on page 30. Any of these courses can be offered on a cost-reimbursable basis as described below.

Customized Courses

Customized courses can be developed in any area of fisheries biology. The Fisheries Academy will put together a course to suit your specific needs. The Academy will design customized courses for Federal, state, tribal, and county agencies on a cost-reimbursable basis. The Academy will also design courses for private organizations through a contract arrangement. To arrange for a customized course, write or call the Fisheries Academy and a staff member will be assigned to work with you to develop the course objectives, content, outline, and format.

Fisheries Academy Staff: (left to right) Wendell Ogden, Chris Horsch, Christina Coates, Carolyn (Tinker) Brill, and Irene Magyar.

"Recognizing the importance of training and updating fishery professionals, the Fisheries Academy contributes significantly to an improved network of qualified individuals with the ability to meet the challenge of protecting and restoring this nation's spectacular and beneficial fishery."

Robert L. Herbst
Executive Director
Trout Unlimited

Once these are established, the Academy will enlist the best possible instructors, prepare training materials and visual aids, arrange classroom and lodging facilities, oversee the presentation, and evaluate the program.

Course Locations

The two mandatory training courses for entry level Fish and Wildlife Service fisheries biologists are held at the Fisheries Academy in Leetown, West Virginia. Many of the other courses offered by the Academy are scheduled throughout the country. Customized courses are held at a time and location convenient to the client. The Fisheries Academy in Leetown, West Virginia, has modern facilities including classrooms; wet and dry laboratories; an audio-visual laboratory and darkroom; and easy access to stream, pond, river and lake environments. Students have full use of the National Fisheries Research Center Library with its computer connections to other major scientific centers. The facilities of the Academy are also available for customized courses.

How to Apply for a Course

An application for the courses scheduled for 1990-91 is contained in this catalog. Federal employees also should submit any training forms required by their agencies to the appropriate office within that agency. Applications from state and local government employees should be accompanied by a letter signed by an authorized official. Private citizens may apply by letter or use the application form in the catalog. Completed applications must arrive at the Academy at least six weeks before the course begins. For additional information call 304/725-8461 or FTS 925-5239.

Costs

The training conducted by the Fisheries Academy is provided without charge to employees of the U.S. Fish and Wildlife Service who are funded under the Fisheries Resources program or other programs providing direct support. A nominal fee, listed with the course descriptions, is charged to all other participants.

Applicants from the private sector must send payment along with their application. (NOTE: ***DO NOT SEND CASH***. Checks or money orders should be made payable to the U.S. Fish and Wildlife Service.)

Participants from other government agencies (Federal, state, or local) will receive an invoice upon completion of the course. Please include a billing address on your application.

Cancellation

Cancellations will be accepted up to two weeks prior to the course. After that date, applicants will be billed for the program whether or not they attend. Substitutions may be made at any time prior to the start of the course.

Continuing Education Units

Continuing Education Units (CEU's) are awarded for the successful completion of Academy courses. A CEU is defined by the National University Extension Association as ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction and qualified instruction. The Academy maintains a permanent record of CEU's earned by participants.

Other Services

The Fisheries Academy has trained meeting facilitators on staff who can help you plan, organize, and run your meetings, workshops, or problem solving sessions. Meetings that are run well save both time and money and increase employee satisfaction. For more information on this service, contact the Superintendent of the Academy.

Several training courses are available on videotape and are sold by the Fisheries Academy. These tapes and their prices are listed beginning on page 34 of this catalog. Each year the Fisheries Academy compiles a list of other training sessions being held throughout the country that are of interest to fisheries biologists. This list, current as of press time, begins on page 41.

"The American Fisheries Society has long advocated increasing the level of professionalism of fishery biologists, whether they work for the Federal Government, the states, universities, or private industry. The Fisheries Academy plays an integral part in helping us achieve this goal. The courses offered by the Academy provide high quality technical training that often is not available on a university's curricula. Members of our Society and other fisheries science professionals should take advantage of these courses to fill in gaps in their formal education, to develop new skills, or to keep abreast of new technology."

Carl Sullivan
Executive Director
American Fisheries Society

Course Descriptions, 1990-91

Course #1104
INTRODUCTION TO FISH HEALTH

DATES AND LOCATIONS:
Feb. 25-Mar. 1, 1991; LaCrosse, WI
Jun. 17-21, 1991; Olympia, WA

TUITION: $230
CEU's: 3.6

This course is a beginning level, introductory program that familiarizes participants with the signs, causes, control and prevention of infectious and noninfectious fish diseases. Instructors include Richard C. Nelson, Ray Brunson, and John Morrison.

Objectives:
After completion of the course, participants will be able to:

- *Recognize and identify the external or gross signs of the more common fish diseases and parasites.*
- *Stain slides for preliminary identification of common disease organisms.*
- *Isolate and culture some disease organisms.*
- *Calculate dosages or treatment levels.*
- *Recognize the need for professional help when the condition exists, and know where to go for that help.*
- *Properly care for and package moribund or dead fish as specimens for shipment to diagnostic laboratories.*
- *Maintain proper records.*
- *Understand the causes and nature of fish diseases.*

Richard C. Nelson

Rick Nelson is the Regional Disease Biologist in charge of the U.S. Fish and Wildlife Service's Fish Disease Control Center in LaCrosse, Wisconsin. He is a career employee of the Service and has worked for 14 years in fish health. Rick completed the Fish and Wildlife Service's long course, "Identification and Control of Fish Diseases," 1976-77. He is a Title 50 Certifying Official and on the Canadian list of approved Fish Health Officials.

Prior to joining the U.S. Fish and Wildlife Service, Rick worked five years for the Alaskan Fish and Game Department and three years for the California Park Service.

Course #5106
BIOSTATISTICS

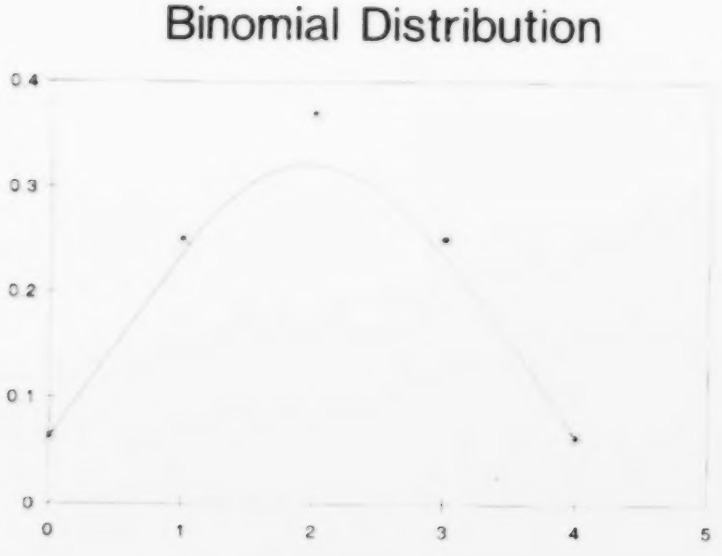
DATE AND LOCATION:
Feb. 25-Mar. 1, 1991; Leetown, WV

TUITION: $230
CEU's: 3.6

This course is designed as a refresher course for individuals with some familiarity with statistics. The emphasis will be on hypothesis testing techniques, measures of central tendency, and sampling techniques. A cookbook-type approach will be used to lead the participants through a variety of different situations where statistics are required to verify experimental results.

Objectives:
Upon completion of the course, participants will:

- ***Use basic statistical terminology and concepts.***
- ***Use statistical measures of central tendency.***
- ***Use common frequency distributions (e.g. normal, Chi-square, Poisson, t-distributions, etc.).***
- ***Use inferential statistical methods, such as t-tests, z-tests, analysis of variance, analysis of covariance, regression, contingency tests, goodness of fit tests, etc.***
- ***Use data transformations properly.***
- ***Use a variety of distribution-free, nonparametric statistical tests (e.g. Mann-Whitney U, Kruskal-Wallace, Spearman Rank Correlations, etc.).***
- ***Discuss microcomputer software packages available for statistical analysis.***



Course #1102
FISH GENETICS AND BROODSTOCK MANAGEMENT

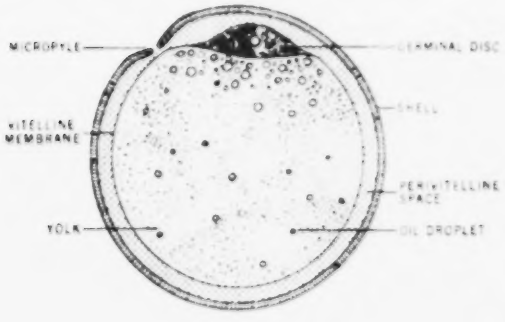
DATE AND LOCATION:
Nov. 5-9, 1990; Wellsboro, PA

TUITION: $230
CEU's: 3.6

Designed for fisheries biologists, hatchery managers, program administrators, and commercial aquaculturists, this course presents an introduction to the basic principles of population genetics and how these principles may be applied to fish populations in both the hatchery and natural environments. Instructors include Fred Allendorf, Jim Wright, and Harold Kincaid.

Objectives:
Graduates will be able to:

- ***Identify and discuss the relative merits of various breeding and selection techniques.***
- ***Understand and discuss the role of selection and hybridization in applied fish breeding programs.***



- ***Compare characteristics of existing fish strains for their relative suitability for various management uses.***
- ***Develop a breeding program to maintain fish strains without significant inbreeding or alteration of desirable genetic characteristics.***

Fred Allendorf

Fred Allendorf received his Ph.D. in genetics and fisheries in 1975 at the University of Washington. His research interests include evolutionary genetics, conservation biology, and genetics and resource management. Currently Fred is serving as program director in population biology and physiological ecology at the National Science Foundation. He is also a professor of zoology at the University of Montana, where he has taught population and ecological genetics, evolution, and the conservation of biological diversity.

Course #2116
FISH TRACKING TECHNIQUES

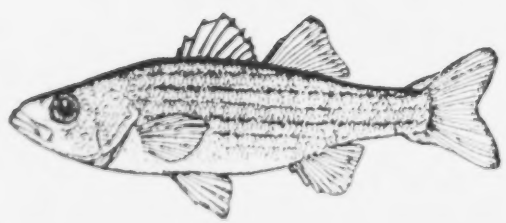
DATE AND LOCATION:
Dec. 3-7, 1990; Panama City, FL

TUITION: $230
CEU's: 3.6

This course is designed for anyone with a need to track fish using tagging, radio, or acoustic devices, both internal and external. It is meant both for beginners in the area and those already using one technique, but who want to learn about others or about the newest available equipment.

Objectives:
After completion of the course, participants will be able to:

- *List sources of fish tracking equipment and information.*
- *Attach or implant tracking devices in fish.*
- *List the limitations of various types of equipment.*
- *Describe how the physical and chemical characteristics of water can affect acoustic or radio signals.*
- *Properly record, analyze, and report tracking data.*



Course #1201
COLDWATER FISH CULTURE

DATE AND LOCATION:
Mar. 4-15, 1991; Athens, GA

TUITION: $400
CEU's: 7.6

Upon completion of this course, participants will be familiar with the basic principles, concepts and techniques employed in coldwater fish husbandry. Instructors include Bryan Kenworthy and Arnold Rakes.

Objectives:
Graduates of this course will be able to:

- *Select good quality, ripe fish for broodstock.*
- *Properly spawn and fertilize eggs.*
- *Monitor and care for eggs during incubation.*
- *Calculate feeding levels based on numbers and size of fry and fingerlings.*
- *Calculate dosage levels for treatment of diseases, and administer disease treatments.*
- *Determine levels of 0_2, pH and water hardness.*
- *Maintain hatchery records.*
- *Determine pond, raceway and distribution tank carrying capacities.*
- *Transport fish to stocking or distribution points in good condition.*

Arnold A. Rakes

Arnold Rakes is a Fisheries Biologist with the Division of Fish Hatcheries, Washington, D.C. He has worked for the U.S. Fish and Wildlife Service since 1976. Prior to assuming the duties of his current position, Arnold worked at various warmwater, coldwater, and striped bass hatcheries; served as Hatchery Manager at Chattahoochee Forest NFH; and served as Chief, Fish Cultural Training at the Fisheries Academy, Leetown, West Virginia.

Arnold received his B.S. degree in marine biology from the University of North Carolina-Wilmington in 1975. Arnold is also a "Class of '81" graduate of the Fisheries Academy's "Fish Hatchery Managers" long course.

Bryan Kenworthy

Bryan Kenworthy is the assistant hatchery manager at the Lahontan National Fish Hatchery/Marble Bluff Fish Facilities Complex, Gardnerville, Nevada. He earned an M.S. degree from the University of Rhode Island in 1975. Graduate work involved the study of the de-nitrification process in water re-use systems used in aquaculture. Bryan started with the Service in 1976 and has had a variety of experiences working with the Service's fisheries program including assignments at five hatcheries, a fisheries assistance office and attending the "Fish Hatchery Managers" long course at the Fisheries Academy in Leetown, West Virginia. He has taught at several of the coldwater short courses in the Pacific Northwest.

Course #4102
PISCICIDE APPLICATIONS

DATE AND LOCATION:
Sept. 9-13, 1991; Glacier, MT

TUITION: $230
CEU's: 3.6

This five day course will cover the chemicals used in the control of undesirable fish species, techniques for their application, and appropriate procedures before and after piscicide application. Students will participate in an actual fish control project. Instructors include Ron Skates.

Objectives:
Graduates will be able to:

- *List the uses of piscicides in general fisheries management.*
- *Obtain the proper approvals for a fish control project.*
- *Avoid negative publicity of a reclamation effort.*
- *List the chemicals used and discuss their advantages and disadvantages.*
- *Identify the effects of piscicides on other organisms.*
- *Calculate the amount of piscicide to use in both flowing and enclosed systems.*
- *Discuss various methods of piscicide application.*
- *Properly schedule piscicide applications.*
- *Neutralize piscicides after application.*
- *Properly dispose of fish that have died.*
- *Revive fish that inadvertently were treated.*

Ron Skates

Ron is a member of the Cheyenne River Sioux Tribe. His fish and wildlife career began in 1971 when he worked as a Tribal Game Warden for the tribe. In 1974 he took a position with the U.S. Fish and Wildlife Service and has had assignments at various Service facilities located in Nebraska, South Dakota, and Montana. He is currently stationed at the Creston Fish and Wildlife Center in Kalispell, Montana, as Project Leader for the technical assistance program, which provides technical services to seven Indian reservations. He graduated in 1978 from Montana State University with a BS in fish and wildlife management. He is currently Regional Director for the Great Plains Region of the Native American Fish and Wildlife Society.

Course #2110
FISH DIVERSIONS & PASSAGEWAYS

DATE AND LOCATION:
Oct. 22-26, 1990; Portland, OR

TUITION: $230
CEU's: 3.6

This course presents state-of-the-art information on fish passageways, fish ladders, fish diversion/guidance techniques, and equipment. It is intended to assist fisheries biologists, bio-engineering specialists, and others responsible for determining the need for, and the construction of, fish ladders, passageways and diversion screens that enhance the migration of various fish species. Instructors include John F. Orsborn.

Objectives:
Upon completion of the course, participants will be able to:

- *Understand and discuss some of the problems involved in the migration of fish.*
- *List and discuss the types of natural and man-made migratory barriers.*
- *List fish species that have been hampered, restricted or endangered because of migratory barriers.*
- *List and discuss the advantages and disadvantages of various fishways.*
- *Select the best sites for construction of a particular fishway.*
- *List and discuss various methods and equipment used in fish guidance systems.*
- *Determine the best method and location for a fish guidance system.*

John F. Orsborn

John F. Orsborn has been a professor and hydraulic research engineer at Washington State University since 1964. He teaches a graduate course in Fisheries Engineering, which covers fish passage facilities, stream restoration, fish guidance, habitat improvement, and computer modeling. He also teaches River Engineering, Hydrology, and Watershed and Stream Morphology. In addition to his teaching, Dr. Orsborn has served as a consultant on numerous fisheries projects, many involving fish passage problems, and conducts research on new fishway designs. Dr. Orsborn received his M.S. in Civil Engineering from the University of Minnesota, and his Ph.D. from the University of Wisconsin in 1964.

Course #2101
PRINCIPLES & TECHNIQUES OF ELECTROFISHING

DATE AND LOCATION:
Jun. 4-6, 1991; Duluth, MN

TUITION: $175
CEU's: 2.4

This course illustrates the basic principles of electricity as applied to electrofishing. It discusses basic electrofishing techniques, with emphasis on the capabilities and limitations of electrofishing as a tool for sampling fish populations. Students will learn proper safety precautions to employ while using electrofishing equipment and first aid for related accidents. Instructors include James B. Reynolds and Larry Kolz.

Objectives:
Upon completion of the course, participants will be able to:

- *Describe the basic principles of electricity and transmission of current in water.*
- *Calculate electrode drop size and arrays for the most efficient electrofishing depending on water conductivity.*
- *List the types of electrofishing equipment that are currently available and discuss the capabilities, limitations and safety features of each.*
- *Know the proper safety precautions to employ while using electrofishing equipment and the priorities for first aid in case of an accident.*
- *Be able to discuss the advantages and disadvantages of using a metal boat as a cathode.*
- *Discuss the effect of electricity on aquatic organisms.*
- *Apply effective electrofishing techniques for quantitative and qualitative sampling of fish populations.*

James B. Reynolds

Jim Reynolds is leader of the Fish and Wildlife Service's Cooperative Fishery Research Unit at the University of Alaska in Fairbanks. He received his Ph.D. from Iowa State University in 1966. His research has focused on the ecology, dynamics, and assessment of freshwater fish populations in Alaska.

A. Lawrence Kolz

Larry Kolz received his Master's degree in electrical engineering from the University of Arizona in 1960. Since 1969, he has worked as Electronics Project Leader at the Denver Wildlife Research Center (formerly with the U.S. Fish and Wildlife Service and now a part of the Department of Agriculture) developing specialized instrumentation for wildlife research.

Course #1129
INTERMEDIATE FISH HEALTH: SIGNIFICANT VIRAL DISEASES OF SALMONIDS

DATE AND LOCATION:
Nov. 5-8, 1990; Leetown, WV

TUITION: $230
CEU's: 3.2

This series of courses is an intermediate level program for experienced field personnel. It is designed to provide an in-depth look at select viral, bacterial, and parasitic fish diseases. This year's course will focus on significant viral diseases of salmonids. The classroom portion will familiarize participants with etiologic agents, their geographic and host ranges, clinical signs of disease, and prevention and control measures. Laboratory work will focus on diagnostic procedures, both presumptive and confirmatory laboratory tests, as well as methods for the detection of asymptomatic infections. A basic understanding of microbiology and/or completion of the "Introduction to Fish Health" course is strongly recommended. Instructors include Phil McAllister.

Objectives:
After completion of this course, participants will be able to:

- ***Recognize and identify the gross clinical signs of the diseases covered.***
- ***Perform a routine fish necropsy.***
- ***Collect and properly prepare the fish tissue for diagnostic laboratory tests.***
- ***Isolate and culture covered disease organisms.***
- ***Select approved disease preventative or control measures.***
- ***Discuss the significance of the covered diseases in the various interagency fish health programs and impacts to fish culture and management programs.***

Phil McAllister

Phil McAllister received his Ph.D. in microbiology in 1973 from the University of Oregon. He started his Federal career with the Department of Agriculture at the National Agricultural Research Center in Beltsville, Maryland. For the past 14 years, he has worked for the Fish and Wildlife Service's National Fisheries Research Laboratory in Leetown, West Virginia. Phil's research focuses on viral diseases of fish.

Course #5110
THE ADVOCACY ROLE OF MANAGERS

DATE AND LOCATION:
Feb. 5-7, 1991; Corpus Christi, TX

TUITION: $175
CEU's: 2.4

This course provides field station personnel with an understanding of the advocacy role they must play in order to maximize public support for the development of fisheries programs. It also defines "limits" as they apply to the advocacy role and it clearly defines the limits of advocacy and the protocol essential to success. Methods and techniques for promoting desirable activities and programs will be discussed.

Objectives:
Upon completion of the course participants will be able to:

- *Identify markets and opportunities to capture them.*
- *Identify "needs" within those markets.*
- *Plan an effective marketing program.*
- *List essential steps in initiating an advocacy project.*
- *List the advantages and define the risk associated with "advocacy" projects.*
- *Define leadership characteristics essential to conduct an "advocacy" program.*
- *Use several techniques to build consensus and to develop partnerships with various groups.*

Course #2117
LARVAL FISH IDENTIFICATION

DATE AND LOCATION:
Jun. 11-13, 1991; Amherst, MA

TUITION: $175
CEU's: 2.4

This three day course is designed to improve larval fish sampling programs. In this course, participants will gain a basic understanding of larval fish ecology, the value of larval fish studies in fisheries research and management, and a working knowledge of larval fish sampling design, techniques, and gear.

Objectives:
At the end of this course, participants will be able to:

- *List the uses and importance of larval fish studies in fisheries research and monitoring.*
- *Describe larval fish anatomy and development.*
- *Correctly identify habitats used by larval fish.*
- *List the various types of larval fish sampling equipment and sources for each.*
- *Properly design sampling studies.*

Course #1131
WATER TREATMENT PROCESSES FOR HATCHERIES

DATE AND LOCATION:
Jun. 4-6, 1991; Bozeman, MT

TUITION: $175
CEU's: 2.4

This course is designed to familiarize fisheries personnel with the technology used in the treatment of water for safe hatchery use and discharge in compliance with NPDES standards. Oxygen injection, ozonation, biofiltration, disease treatment delivery systems, and fish diet manipulation are among the topics to be covered. This course will include both lecture and hands-on experience, with field trips to the Bozeman Fish Technology Center. Instructors include Charlie Smith.

Objectives:
Upon completion of this course, participants will be able to:

- *Determine dissolved gas levels in hatchery water.*
- *Describe the various methods to aerate and degas water using pure oxygen.*
- *Be able to discuss the advantages and disadvantages of the different oxygen injection units.*
- *Discuss the various methods used to disinfect hatchery water inflows and effluent.*
- *Discuss various safe methods for delivering legal chemical treatments for control of infectious fish diseases.*
- *Identify the maintenance requirements for various water treatment systems.*
- *Describe methods for reconditioning used hatchery water for re-use.*
- *Explain how pollutant concentration in hatchery effluent is affected by fish diet composition.*
- *Select an appropriate water treatment system for their facility.*

Charlie E. Smith

Charlie Smith is Director of the U.S. Fish and Wildlife Service's Fish Technology Center in Bozeman, Montana, where he has worked for the past 23 years. Prior to coming to Bozeman he worked at the Western Fish Nutrition Laboratory in Willard, Washington, for seven years.

Mr. Smith received a Bachelor's degree in biology from Walla Walla College and completed graduate work in microbiology and pathology at Montana State University.

Course #5101
INSTRUCTOR TRAINING

DATE AND LOCATION:
Jul. 22-26, 1991; Leetown, WV

TUITION: N/A
CEU's: 3.6

This course is designed for people who are or may become regular instructors for Fisheries Academy courses. It will cover principles of adult learning and presentation skills for effective classroom instruction.

Objectives:
Graduates of this course will be able to:

- *Establish an appropriate climate for learning.*
- *Use trainer skills and techniques appropriate to specific groups, environments, and objectives.*
- *Give and receive feedback.*
- *Use evaluations to improve skills and abilities.*

Course #1130
BASIC BIOLOGY FOR TECHNICIANS

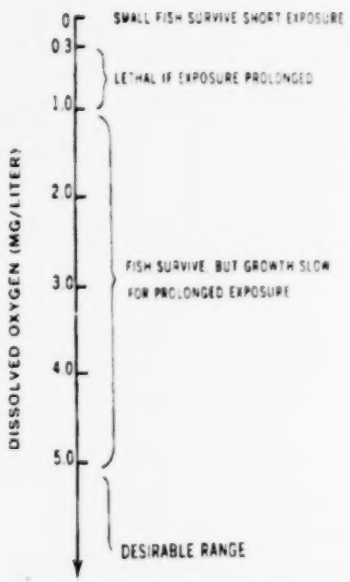
DATE AND LOCATION:
Mar. 4-8, 1991; Marquette, MI

TUITION: $230
CEU'S: 3.6

This five day course will provide training in basic fishery field techniques to biological and physical science technicians, biological aids, and animal caretakers working in sea lamprey control, fish hatcheries, and fishery assistance offices. The course will cover the basics of fish identification and handling, habitat requirements of fish, population assessment techniques, water quality analysis, toxicology and contaminants, and pesticide application. The course information will be oriented toward the Great Lakes Region.

Objectives:
Upon completing this course, participants will be able to:

- *Visually identify common fish species and show how to use a key for identification.*
- *Describe the preferred habitat of common sport fish, forage fish, and sea lamprey.*
- *List the basic types of equipment used in fish population sampling along with their target species and efficiencies.*
- *Describe the statistical tests used to analyze population data.*
- *Measure water temperature, dissolved oxygen, pH, total alkalinity, hardness, and levels of ammonia and chlorine using meters and kits.*
- *Estimate stream discharge volume.*
- *Recognize stress in fish and correct factors that cause stress.*
- *Properly transport, handle, and care for fish.*
- *Describe the effects of pesticides on the environment and human health.*
- *Use basic pesticide application equipment.*
- *Properly handle pesticides.*
- *Describe basic toxicity testing principles and the principles of contaminant uptake.*



Course #2115
ISSUES IN FISHERIES RESOURCES MANAGEMENT

DATE AND LOCATION:
Jan. 15-17, 1991; Albuquerque, NM

TUITION: N/A
CEU's: 1.6

This two day seminar is designed for people in upper level management (GS/GM-13/15, if Civil Service) who are responsible for major fisheries management decisions. The seminars address a subject area of current interest and with great or potentially great impact on the nation's fisheries resources. Seminar participants are provided with an overview of the problem, basic information that they will need in order to reach a sound management decision, an opportunity to consult with experts in the field, and time to discuss the impact of different management decisions with their peers.

This year's seminar will discuss the impacts of contaminants on the nation's natural resources (with an emphasis on fisheries), the Service's role in dealing with contaminants, and potential problems we may face in the future.

ISSUES

Questions & Answers

Facts

Budget

Action

Entry Level Courses

The following two courses were designed for entry level fisheries biologists in the Fish and Wildlife Service. These courses will provide fisheries biologists at the GS-5/9 level with a background in the operation of the Service's fisheries programs. Each course runs from two-three weeks. Regions will be requested to submit nominees for each course through a special notice issued by the Fisheries Academy. **(These courses are open to Fish and Wildlife Service personnel only.)**

INTRODUCTION TO U.S. FISH AND WILDLIFE SERVICE FISHERIES PROGRAM (MODULE I)

Objectives:
After completion of this course, participants will be able to:

- *Explain the organization and responsibilities of the Washington Office, Regional Offices, and field projects in the Service's fisheries program.*
- *Identify key personnel in the Service's fisheries program.*
- *Explain the National Recreational Fisheries Policy.*
- *Discuss the Service budget process and the legislation that directs the fisheries program.*
- *Describe the function and role of the National Fish Hatchery Program.*
- *Describe the functions and roles of Fisheries Assistance in the Service's fisheries program.*
- *Apply basic safety procedures related to chemicals, equipment, electricity, and water activities.*
- *Identify current software programs that are available for use by fisheries personnel and their applications.*
- *Identify potential personal career pathways.*

"A good number of our fish cultural personnel have benefitted from the Fish Health and Fish Culture courses. The courses have been well received. Our people have always returned to their respective stations motivated and anxious to put into practice the things they learned. It has resulted in a more professional approach to their work and this has rubbed off to their co-workers as well.

In Michigan we are extremely proud of our Fish Culture and Fisheries Management programs because of the high professional caliber of our staff. Your Academy can claim some of the credit for that!"

Harry Westers
Hatchery Operations Program Manager
Michigan Dept. of Natural Resources

U.S. FISH AND WILDLIFE SERVICE FISHERIES OPERATIONS (MODULE II)

Objectives:
After completion of the course, participants will be able to:

- *Discuss and apply Service policies and Federal authorizations that serve as guidelines for the Service's fisheries program.*
- *Coordinate a fisheries program with other Federal, state, tribal, and private user groups.*
- *Develop a basic management plan for a fishery.*
- *Describe the limitations of fish production at Service facilities and the new technologies that can be employed to increase production and quality.*
- *Describe the Service Fish Genetics Policy.*
- *Develop hatchery evaluation and wild stock evaluation programs.*
- *Identify and outline corrective measures required to solve passage problems at various blocks to fish migration.*
- *Apply fish health policies including the Service Policy and various Watershed Compacts.*
- *Discuss the role of hatchery manager, management biologist, fish pathologist, associate manager, ARD, RD, and Director when fish disease outbreaks occur.*
- *Apply basic fundamentals of scientific experimental design.*

Application

GENERAL INSTRUCTIONS:
Please complete a separate application for each course. Applications must be received by the Academy no later than six weeks prior to the scheduled starting date of the course. See "Year at a Glance" for closing dates. Applicants from the private sector must send payment with application. **DO NOT SEND CASH.** Checks or money orders should be made payable to the U.S. Fish and Wildlife Service. Mail applications to: Superintendent, Fisheries Academy, USFWS, Rt. 3, Box 49, Kearneysville, WV 25430.

COURSE INFORMATION:

Course #_____ Title _____

Date_____ Location _____

APPLICATION INFORMATION: (business address/telephone preferred)

Name_____ Social Security Number*_____

Business_____

Address_____

City_____ State_____ Zip _____

Telephone_(___)_____(business) _(___)_____(home)

CURRENT EMPLOYMENT STATUS:

_____Federal _____Student _____Consultant _____Tribal

_____State _____Private _____Other Public Agency

BILLING INFORMATION:

Agency Name_____

Address_____

City_____ State_____ Zip _____

Attention_____ Telephone _(___)_____

*Providing your SSN is voluntary. It will be used internally to verify training course attendance statistics. It will not be disclosed to other sources.

YEAR AT A GLANCE

COURSE NUMBER	COURSE TITLE	DATE LOCATION	COURSE LEADER	CEU's	COST	CLOSING DATE
4204	Introduction to USFWS Fisheries Program (Module I)	Oct. 15-26, 1990 Leetown, WV	Horsch	N/A	N/A	09/04/90
2110	Fish Passageways and Diversion Structures	Oct. 22-26, 1990 Portland, OR	Magyar	3.6	$230	09/10/90
1129	Intermediate Fish Health	Nov. 5-8, 1990 Leetown, WV	Horsch	3.2	$230	09/24/90
1102	Fish Genetics and Broodstock Management	Nov. 5-9, 1990 Wellsboro, PA	Magyar	3.6	$230	09/24/90
2116	Fish Tracking Techniques	Dec. 3-7, 1990 Panama City, FL	Magyar	3.6	$230	10/22/90
4204	Introduction to USFWS Fisheries Program (Module I)	Jan. 7-18, 1991 Leetown, WV	Horsch	N/A	N/A	11/26/90
5109	Current Stewardship Events for Fisheries Leadership (Contaminants)	Jan. 15-17, 1991 Albuquerque, NM	Magyar	2.4	$175	12/06/90
4305	U.S. Fish and Wildlife Service Fisheries Opeations (Module II)	Jan. 28-Feb. 15, 1991 Leetown, WV	Horsch	N/A	N/A	12/17/90
5110	The Advocacy Role of Managers	Feb. 5-7, 1991 Corpus Christi, TX	TBA	2.4	$175	12/24/90
5106	Biostatistics	Feb. 25-Mar. 1, 1991 Leetown, WV	Magyar	3.6	$230	01/14/91
1104	Introduction to Fish Health	Feb. 25-Mar. 1, 1991 LaCrosse, WI	Nelson	3.6	$230	01/14/91

TBA = To Be Announced

YEAR AT A GLANCE

COURSE NUMBER	COURSE TITLE	DATE LOCATION	COURSE LEADER	CEU's	COST	CLOSING DATE
1130	Basic Biology for Technicians	Mar. 4-8, 1991 Marquette, MI	TBA	3.6	$230	01/22/91
1201	Coldwater Fish Culture	Mar. 4-15, 1991 Athens, GA	Horsch	7.6	$400	01/22/91
4305	U.S. Fish and Wildlife Service Fisheries Operations (Module II)	Apr. 8-26, 1991 Leetown, WV	Horsch	N/A	N/A	02/25/91
4204	Introduction to USFWS Fisheries Program (Module I)	May 6-17, 1991 Leetown, WV	Horsch	N/A	N/A	03/25/91
2101	Principles & Techniques of Electrofishing	Jun. 4-6, 1991 Duluth, MN	Magyar	2.4	$175	04/23/91
1131	Water Treatment Processes for Hatcheries	Jun. 4-6, 1991 Bozeman, MT	Horsch	2.4	$175	04/23/91
2117	Larval Fish Identification	Jun. 11-13, 1991 Amherst, MA	Magyar	2.4	$175	04/29/91
1104	Introduction to Fish Health	Jun. 17-21, 1991 Olympia, WA	Brunson	3.6	$230	05/06/91
5101	Instructor Training	Jul. 22-26, 1991 Leetown, WV	TBA	3.6	N/A	05/10/91
4305	U.S. Fish and Wildlife Service Fisheries Operations (Module II)	Aug. 5-23, 1991 Leetown, WV	Horsch	N/A	N/A	05/24/91
4102	Piscicide Applications	Sept. 9-13, 1991 Glacier, MT	Magyar	3.6	$230	06/29/91

Other Academy Courses

The following courses will not be offered during the 1990-91 calendar year. However, your organization can arrange for any of these courses to be offered on a cost reimbursable basis, as described on page 6. Contact the Superintendent for further details.

Course #1107
COOLWATER FISH CULTURE

Participants learn the basic principles, concepts and techniques employed in the production of coolwater fishes.

Course #3101
HYDRAULICS & HYDROLOGY FOR F'SHERY BIOLOGISTS

Fishery biologists are concerned with determining the effects of habitat alteration on the aquatic biota. Application of fundamental hydraulics and hydrology will assist them in predicting the impact of various environmental modifications.

Course #5107
MANAGING PUBLIC AWARENESS PROGRAMS ON FIELD STATIONS

This course provides training in the management of public awareness and field station outreach programs aimed toward improved community-station relationships and increased local support for the Fish and Wildlife Service's Fisheries or Wildlife Programs. The course can be adapted for other groups or businesses that deal with visitors and public outreach programs.

Course #1122
SELECTED TOPICS FOR FISH HATCHERY MANAGERS-- COLDWATER FISH CULTURE

Participants discuss state-of-the-art fish cultural information with experts in the field. The course will consist of several topics selected for current interest.

Course #1125
STRIPED BASS CULTURE

This basic course covers the principles, concepts and techniques used in striped bass and hybrid bass culture. Topics include broodstock collection and rearing, care and spawning of broodstock, egg care and hatching, feeds and feeding, physiology and stress, transportation and stocking, diseases and their treatments, tagging and marking, water quality, and pond maintenance.

Course #4101
CHEMICALS USED IN HATCHERY MANAGEMENT PRACTICES

This one-week course familiarizes fishery biologists, technicians and management personnel with the chemicals (pesticides, insecticides, herbicides, fungicides, drugs and medications) currently used in fish husbandry and fishery management.

Course #1127
CULTURE AND MANAGEMENT OF STURGEON AND PADDLEFISH

This course, designed for hatchery technicians and others involved in the production and management of sturgeon and paddlefish, will familiarize participants with the basic principles, concepts and techniques employed in sturgeon and paddlefish husbandry and managment.

Course #2102
FISHERY MANAGEMENT OF SMALL IMPOUNDMENTS

This one-week course describes the principles involved in managing impoundments of 50 acres or less. The participants review past and future management strategies.

Course #1111
THE USE OF HEMATOLOGICAL TECHNIQUES FOR THE PRESUMPTIVE DIAGNOSIS OF IHN VIRUS DISEASE

This two-day course familiarizes participants with certain hematological techniques that are useful for the presumptive diagnosis of IHN virus disease.

Course #1123
SELECTED TOPICS FOR FISH HATCHERY MANAGERS-- WARMWATER FISH CULTURE

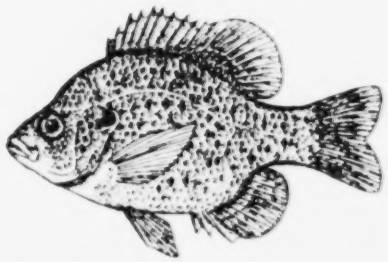
This two- to five-day course provides participants with state-of-the-art fish cultural information. The course will consist of several topics selected for current interest. Topics and course duration can be modified to meet the training needs of the target audience.

Course #1128
ZOOPLANKTON SAMPLING AND ANALYSIS FOR INCREASED FISH PRODUCTION

This two day course teaches the identification of major zooplankton groups that serve as food for fry of fish species such as striped bass and red drum. Through intensive hands-on experience, students learn proper zooplankton collecting techniques and several methods of sample preservation and counting. Instructors also discuss the relationship between zooplankton population numbers and fish production as well as things that can be done to influence zooplankton numbers and maximize your production.

Course #1103
WARMWATER FISH CULTURE

This course will familiarize participants with the basic principles, concepts and techniques currently in use for the production of warmwater fishes.



Course # 1426
FISH HEALTH MANAGEMENT AND DISEASE DIAGNOSIS

This five-month course prepares fisheries biologists for work as fish health specialists. Participants must have a B.S. degree and a background in basic microbiology, virology, parasitology, or bacteriology. They should also have from three to five years experience in aquaculture or fisheries management. This course was offered during the 1988-89 calendar year. The Fisheries Academy will announce well in advance the next time the course will be offered.

"I...heard nothing but positive comments from those attending the Electrofishing Course. Everyone learned a great deal and my fisheries supervisors were extremely satisfied with the overall content and focus... The course provided valuable information towards our efforts to improve the standardization and safety aspects of our electrofishing activities. ...from the perspective of state fisheries agencies, these workshops represent one of the most valuable services that the USFWS provides."

Kenneth F. Wich, Director
Division of Fish and Wildlife
***NY State Dept. of Environmental* Conservation**

Course #1110
GAS SUPERSATURATION IN AQUATIC SYSTEMS

This course acquaints fishery biologists with the basic concepts of gas supersaturation. Participants learn to use the saturometer and calculate percentage of total gases and nitrogen.

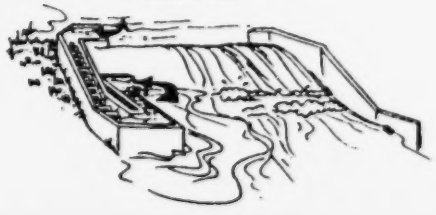
Course #1114
COMPUTERS AS A TOOL IN FISHERIES AND HATCHERY MANAGEMENT

Both of these courses are designed for people already familiar with the basics of MS-DOS, spreadsheets, databases, statistical packages, and word processing. Participants will learn how to use existing commercial software for applications to hatchery or fisheries management problems. The courses will also cover available software that has been designed specifically for fisheries or hatchery applications, and list sources of this software. This is not an introductory computer course.

Course # 1208
PACIFIC SALMON CULTURE

This basic course covers the principles, concepts and techniques employed in salmon culture. Topics include broodstock capture methods, selection, care and spawning; egg care and hatching; feeds and feeding; physiology and stress; diseases and their treatments; smoltification; tagging and marking; management of wild stocks; and other aspects of salmon culture.

Denil Fish Ladder



One Day Courses

The following is a list of one-day courses that are designed to be offered as part of, or in conjunction with, a scheduled meeting, conference or training program. They will be presented on a cost reimbursable basis.

Course #1109
FEEDS AND FEEDING

This basic course covers various types of feed (pellets, moist, floating), feed composition, ingredients, feeding rate calculations, storage methods, and automatic feeders.

Course #1113
AQUATIC WEED CONTROL FOR HATCHERIES

Students identify common pond weeds and algae, and learn methods for their control by mechanical, manual and chemical means. Students also learn a method for calculating pond volumes and for calculating dosages for treating aquatic weeds.

Course #3104
WATER QUALITY

This course concentrates on those aspects of water quality that regulate the stability of water for holding and rearing fish. The information can be altered to address either coldwater or warmwater fish.

Course #1112
FISH TRANSPORTATION

Transportation methods and equipment are discussed, along with the chemicals used as anesthetics and disease prophylactics, and the treatment levels used in transporting eggs, fry and adult fish.

Course #1115
AERATION/DEGASSIFICATION

This course covers the various methods and equipment used in pond and raceway aeration, as well as methods for degassing water supersaturated with nitrogen.

Course #1116
FISH DISEASES

Students are given in-depth coverage of two or three bacterial diseases prevalent in warm or cold water, depending on the interest of the group.

Course #1117
BAITFISH CULTURE

This course covers various cultural methods used in rearing baitfish, both in a pond situation and in a small backyard operation. Diseases, feeding rates, and transportation will be covered.

Audio-Visual Training Courses

The following tapes are available on VHS or 3/4" videotape. They may be ordered from the Academy using the order form found on page 36.

FISH MARKING: PRINCIPLES & TECHNIQUES
Time: 43.5 minutes
Cost: $30.00

This program examines 37 ways to mark fish and assists fishery biologists in selecting the best method for marking. In addition to introducing fishery biologists to fish marking techniques, the program is ideally suited for college ichthyology or fisheries related courses and can provide background information for people from other fields.

The program divides the marking techniques into three general categories--biological, chemical, and physical--and discusses the advantages and disadvantages of each. Examples are also given on ways to mark clams, crustaceans, and turtles. Also included are sections on planning and conducting marking studies, and interpretation of retention and recovery rates.

PREPARING FISH FOR SHIPMENT TO DIAGNOSTIC STATIONS
Time: 16.5 minutes
Cost: $30.00

This program examines four ways to successfully prepare fish for shipment to diagnostic laboratories. The information is presented in a "cookbook" fashion, using photographs of shipping procedures to enable the viewer to follow along step by step. The program is highly recommended for anyone involved in sending or receiving diseased fish samples.

MEASURING POND VOLUME
Time: 16.5 minutes
Cost: $30.00

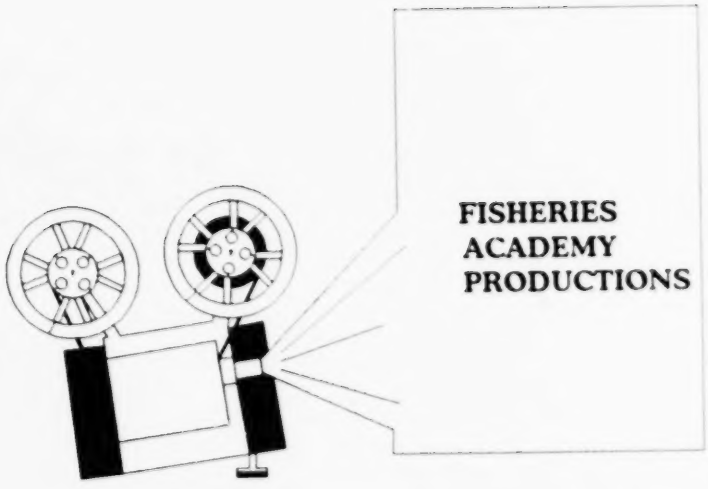
This program describes how to measure pond and tank volumes. The approach is simple, graphically illustrated and presented in a manner that is easily understood by the nonprofessional fish farmer. It's an excellent program for people who need to know volumes before applying chemicals for weed or disease control, or to determine fish stocking densities.

CATFISH CULTURE
Time: 43 minutes
Cost: $30.00

The currently acceptable methods of catfish culture are described in this "how-to-do-it" presentation, which graphically portrays topics such as the care and feeding of broodstock, the preparation of spawning facilities, harvesting, and transportation. New aquaculturists will find the information extremely helpful in getting started, and experienced fish farmers will find that it provides an excellent review of basic cultural practices.

ZOOPLANKTON SAMPLING TECHNIQUES
Time: 30 minutes
Cost: $30.00

Zooplankton are an important initial food source for fry of many fish species. Sampling the zooplankton population in rearing ponds is important to determine the optimal time for stocking fish into your rearing pond. This program shows the various methods used for sampling zooplankton populations and discusses their relative advantages and disadvantages. It also shows how to preserve your zooplankton sample for later analysis, calculate the number of organisms per liter, identify the organisms present, and use this information to properly time the stocking of your rearing ponds.



Videotapes

To order, send order blank and payment to: Fisheries Academy, Rt. 3, Box 49, Kearneysville, WV 25430. **NOTE: DO NOT SEND CASH.** Checks or money orders should be made payable to the U.S. Fish and Wildlife Service.

Order Form

	Quantity	Price	Total
Fish Marking	_____	$ _____	$ _____
Preparing Fish For Shipment	_____	_____	_____
Measuring Pond Volume	_____	_____	_____
Catfish Culture	_____	_____	_____
Zooplankton Sampling Techniques	_____	_____	_____

(Check One: _____VHS format or _____3/4" format)

Total number of programs ordered _____

Total amount enclosed $ _____. **(DO NOT SEND CASH)**

Name_____

Street_____

City_____ **State**_____ **Zip Code**_____

Telephone_____

Fisheries Academy Instructors

The following is a partial list of instructors who regularly teach for the Academy.

Allendorf, Fred
National Science Foundation
Fish Genetics and Broodstock Management

Anderson, Dennis
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Anderson, Doug
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Andersen, Richard
U.S. Fish and Wildlife Service
Warmwater Fish Culture

Athern, Jim
Army Corps of Engineers
Pacific Salmon Culture

Austin, Robert
Bonneville Power Administration
Coldwater Fish Culture

Barney, Phyllis
U.S. Fish and Wildlife Service
Coolwater Fish Culture
Coldwater Fish Culture
Fish Health Management and Disease Diagnosis
Fish Health Management
USFWS Fisheries Operations (Module II)

Barrows, Rick
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Coolwater Fish Culture

Bast, Dale
U.S. Fish and Wildlife Service
Coldwater Fish Culture

Bates, Ken
Washington State Dept. of Fisheries
Fish Passageways & Diversion Structures

Boyd, Claude
Auburn University
Selected Topics--Warmwater Fish Culture

Brandt, Tom
U.S. Fish and Wildlife Service
Striped Bass Culture
Warmwater Fish Culture
Fish Health Management and Disease Diagnosis

Brimm, Steve
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Brunson, Ray
U.S. Fish and Wildlife Service
Introduction to Fish Health

Bullock, Graham (Pete)
U.S. Fish and Wildlife Service (retired)
Diagnostic and Detection Techniques for Fish Pathogens
Fish Health Management and Disease Diagnosis

Bumgarner, Dan
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Carmichael, Gary
U.S. Department of Agriculture
Warmwater Fish Culture

Chase, Don
Washington State Dept. of Wildlife
Selected Topics--Coldwater Fish Culture

Cipriano, Rocco
U.S. Fish and Wildlife Service
Diagnostic and Detection Techniques for Fish Pathogens
Fish Health Management and Disease Diagnosis

Colesante, Richard
Oneida Hatchery Research Unit
Coolwater Fish Culture

Desens, Denise
U.S. Fish and Wildlife Service
Introduction to Fish Health

Dwyer, Pat
U.S. Fish and Wildlife Service
Pacific Salmon Culture
Gas Supersaturation

Erdahl, Dave
U.S. Fish and Wildlife Service
Selected Topics--Coldwater Fish Culture
Coldwater Fish Culture

Erickson, Dave
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Fries, Joe
U.S. Fish and Wildlife Service
Zooplankton Sampling
Warmwater Fish Culture

Graves, Kerry
U.S. Fish and Wildlife Service
Coolwater Fish Culture
Striped Bass Culture
Warmwater Fish Culture
Zooplankton Sampling

Graybill, Jim
Mount Hood Community College, Gresham, Oregon
Pacific Salmon Culture

Grover, Jerry
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Hardy, Ron
Northwest and Alaska Fisheries Center
Pacific Salmon Culture

Harrell, Reginal
University of Maryland
Striped Bass Culture

Hedrick, Ron
University of California-Davis
Fish Health Management and Disease Diagnosis

Heil, Norman
U.S. Fish and Wildlife Service
Warmwater Fish Culture

Herman, Roger
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Hershberger, William
University of Washington
Pacific Salmon Culture

Horrall, Ross
University of Wisconsin
Pacific Salmon Culture

Horsch, Christopher
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Pacific Salmon Culture
Fish Health Management
Fish Health Management and Disease Diagnosis
Introduction to USFWS Fisheries Program (Module I)
USFWS Fisheries Operations (Module II)

Hughes, Janice
Louisiana Dept. of Wildlife and Fisheries
Striped Bass Culture

Hughes, Steve
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Pacific Salmon Culture
Selected Topics--Coldwater Fish Culture

Hunn, Joe
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Jensen, Buddy
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)
USFWS Fisheries Operations (Module II)

Kennerthy, Bryan
U.S. Fish and Wildlife Service
Coldwater Fish Culture

Kincaid, Harold
U.S. Fish and Wildlife Service
Fish Genetics and Broodstock Selection

Kindschi, Greg
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Water Treatment Processes for Hatcheries
USFWS Fisheries Operations (Module II)

Knudson, Eric
U.S. Fish and Wildlife Service
Pacific Salmon Culture

Kolz, Larry
U.S. Dept. of Agriculture
Principles & Techniques of Electrofishing

Kynard, Boyd
U.S. Fish and Wildlife Service
Fish Passageways and Diversion Structures
USFWS Fisheries Operations (Module II)

Leek, Steve
U.S. Fish and Wildlife Service
Introduction to Fish Health

Lovell, Tom
Auburn University
Selected Topics--Warmwater Fish Culture

MacCallum, Vic
Maryland DNR Police
Introduction to USFWS Fisheries Program (Module I)

MacConnell, Beth
U.S. Fish and Wildlife Service
Coldwater Fish Culture

Magyar, Irene
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Martiw, Maria
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Markwitz, Joesph
U.S. Fish and Wildlife Service (Retired)
Introduction to USFWS Fisheries Program (Module I)

Mayeux, Tony
U.S. Fish and Wildlife Service
Striped Bass Culture

McAllister, Phil
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis
Intermediate Fish Health

McCraren, Joseph
U.S. Trout Farmers
Baitfish Culture
Introduction to USFWS Fisheries Program (Module I)

McDaniel, Dave
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Meyer, Fred (Retired)
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Miller, Bill
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Coolwater Fish Culture

Mitchell, Andrew
U.S. Fish and Wildlife Service
Baitfish Culture
Warmwater Fish Culture

Moring, John
University of Maine
Baitfish Culture

Morrison, John
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Nelson, Rick
U.S. Fish and Wildlife Service
Introduction to Fish Health

Nichols, Dave
Oregon Department of Fisheries
Fish Passageways & Diversion Structures

Ogden, Wendell
U.S. Fish and Wildlife Service
Baitfish Culture
Introduction to USFWS Fisheries Program (Module I)

Orme, Leo
Lawrence County Extension Service, Spearfish, South Dakota
Baitfish Culture

Orr, Wesley
U.S. Fish and Wildlife Service
Selected Topics--Coldwater Fish Culture
Coldwater Fish Culture

Orsborn, John
Washington State University
Hydraulics & Hydrology

Owsley, Dave
U.S. Fish and Wildlife Service
Coolwater Fish Culture
Coldwater Fish Culture
Introduction to USFWS Fisheries Program (Module I)
Water Treatment Processes for Hatcheries

Palisoul, Alan
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Parker, Nick
U.S. Fish and Wildlife Service
Striped Bass Culture

Pearce, Robert
National Marine Fisheries Service
Fish Passageways & Diversion Structures

Peoples, Bob
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Piper, Bob
Editor, Progressive Fish Culturist
Coldwater Fish Culture
Coolwater Fish Culture

Pitman, Bob
U.S. Fish and Wildlife Service
Warmwater Fish Culture

Pratschner, Greg
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Selected Topics--Coldwater Fish Culture
Biostatistics
Computers
Introduction to USFWS Fisheries Program (Module I)
USFWS Fisheries Operations (Module II)

Rainey, Steve
National Marine Fisheries Service
Fish Passageways & Diversion Structures

Rakes, Arnold
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Baitfish Culture
Warmwater Fish Culture
Fish Transportation
Pacific Salmon Culture

Reynolds, Jim
U.S. Fish and Wildlife Service
Principles & Techniques of Electrofishing

Rizzo, Ben
U.S. Fish and Wildlife Service
Fish Passageways & Diversion Structures

Roseburg, Ralph
U.S. Fish and Wildlife Service
Computers

Sauter, Charles
Maryland DNR Police
Introduction to USFWS Fisheries Program (Module I)

Schacte, John
New York Department of Environmental Conservation
Introduction to Fish Health
USFWS Fisheries Operations (Module II)

Schill, Bane
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Schnick, Rosalie
U.S. Fish and Wildlife Service
Selected Topics--Coldwater Fish Culture
Selected Topics--Warmwater Fish Culture
Fish Health Management and Disease Diagnosis
USFWS Fisheries Operations (Module II)

Simon, Ray
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Skates, Ron
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Introduction to USFWS Fisheries Program (Module I)
Piscicide Uses and Application
USFWS Fisheries Operations (Module II)

Smith, Charlie
U.S. Fish and Wildlife Service
Coldwater Fish Culture
Water Treatment Processes for Hatcheries

Smith, Lynwood
University of Washington
Pacific Salmon Culture

St. Pierre, Dick
U.S. Fish and Wildlife Service
Fish Passageways and Diversion Structures

Streufert, Jon
U.S. Fish and Wildlife Service
Coldwater Fish Culture

Thoesen, John
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Warren, James
U.S. Fish and Wildlife Service
Introduction to Fish Health

Watts, Fred
University of Idaho
Hydraulics & Hydrology

Weaver, Jim
U.S. Fish and Wildlife Service
Introduction to USFWS Fisheries Program (Module I)

Wedemeyer, Gary
U.S. Fish and Wildlife Service
Fish Health Management and Disease Diagnosis

Wellborn, Tom
County Extension Office, Blountstown, Florida
Striped Bass Culture
Baitfish Culture
Selected Topics--Warmwater Fish Culture

Westers, Harry
Michigan Dept. of Natural Resources
Selected Topics--Coldwater Fish Culture

Wolf, Ken
U.S. Fish and Wildlife Service (Retired)
Fish Health Management and Disease Diagnosis

Woods, Curry
Baltimore Gas and Electric Co.
Striped Bass Culture

Wright, Jim
Pennsylvania State University
Fish Genetics and Broodstock Management

Wright, Lloyd
U.S. Fish and Wildlife Service
Striped Bass Culture
Warmwater Fish Culture
Baitfish Culture
Managing Small Impoundments
USFWS Fisheries Operations (Module II)

Other Available Courses

The following is a partial list of fisheries related courses being offered by other organizations throughout the country. The list was current as of the time of printing.

TEXAS SHRIMP FARMING SHORT COURSE

Contact Person:
Granvil Treece
Sea Grant College Program
Texas A&M University
College Station, TX 77843-4115
(409) 845-7527

Audience Designed For: Individuals actively involved in shrimp farming, as well as potential aquaculture entrepreneurs and investors who are considering opportunities in the commercial culture of shrimp.

Length: 10 days

Date: Mid-September every year.

Location: Marine Science Institute, Port Aransas, TX

Cost: $700. Tuition includes room, board, educational materials, and field trips, as well as transportation to and from airport.

Course Description: The course will cover pond design and construction, hatchery design and operation, maturation and spawning technology, life history and biology of penaeid shrimp, larval rearing technology, culture of larval foods, nauplii and postlarval shipping, stocking strategies, economics, diseases, marketing, site selection and permits, and four field trips.

SILVICULTURE FOR BETTER MANAGEMENT OF NON-TIMBER RESOURCES

Contact Person:
Mr. Fred Baker or
Rob Lilieholm
Department of Forest Resources
Utah State University
Logan, UT 84322-5215
(801) 750-2455

Audience Designed For: Natural resource professionals needing experience in silviculture.

Length: 2 weeks

Date: March 25-April 5, 1991

Location: Utah State University

Cost: $1350 estimated.

Course Description: The course will provide a working knowledge of silvicultural methods and applications.

PROFESSIONAL DEVELOPMENT FOR OUTDOOR RECREATION PLANNERS/MANAGERS

Contact Person:
Michael Butkus
Institute for Outdoor Recreation and Tourism
Utah State University UMC 5235
Logan, UT 84322
(801) 750-2530 or 2487

Audience Designed For: Mid-level public land managers.

Length: Actual course length is 3 weeks on campus; in addition participants prepare a project and an oral presentation of the project.

Date: April 8-26, 1991 and March 23-April 10, 1992

Location: Utah State University

Cost: $3100-$3450 (single/double occupancy) includes tuition, instructional material, lodging and meals for 3 weeks.

Course Description: Exposure to new policies, concepts, models, technology, including outdoor recreation policy formation and implementation, recreation demand concepts and models, recreation marketing concepts, regional socio-economic analysis, linear programming and planning techniques, data collection theories and methods.

AQUACULTURE TRAINING PROGRAM OF THE INTERNATIONAL CENTER FOR AQUACULTURE

Contact Person:
Dr. William Deutsch
International Center for Aquaculture
203 Swingle Hall
Auburn University
Auburn, AL 36849-5419
(205) 844-4786

Audience Designed For: The course is for fisheries officers, biologists, managers, planners, agricultural loan officers, and administrators who will be involved in aquaculture related activities, and others with a strong interest in aquaculture. It is particularly designed for international participants, but US students are welcome. Participants are required to have a basic knowledge of English, however, the faculty and staff of the program have extensive international experience and fluency in other languages including Spanish, French, Portuguese, and Indonesian.

Length: 16 weeks

Date: March 21-July 11, 1991

Location: Department of Fisheries and Allied Aquacultures, Auburn University

Cost: $4,500 tuition; and approximately $700/month living expenses.

Course Description: The course offers a thorough coverage of the basic principles of aquaculture in addition to fish reproduction, hatchery management,

pond construction, fish production, water quality management, fish nutrition, fish health, economics and marketing, and aquaculture extension. Emphasis is placed on practical experience, and each participant is assigned a pond for growing one or more of several species of fish or crustacean.

FISH HABITAT MANAGEMENT

Contact Person:

Winifred Sidle
UMC-5210
Utah State University
Logan, UT 84322-5210
(801) 750-1090 and

Steve Flickinger
Dept. of Fish and Wildlife Biology
Colorado State University
Fort Collins, CO 80523
(303) 491-5657

Audience Designed For: Mid-career professionals (five+ years experience) in fisheries, wildlife, and related disciplines. Course was developed by and for personnel of the USDA, Forest Service, but is open to professionals from other organizations.

Length: 2 weeks, 8 hrs. per day.

Date: October 1-12, 1990. Repeated about the same time every year.

Location: Colorado State University

Cost: $1800 per person, including room, meals, books, class materials, and transportation for field trips.

Course Description: Participants will acquire needed skills and knowledge to evaluate physical factors (including geomorphology and hydrology) affecting aquatic environments; complete a habitat analysis; plan and evaluate habitat enhancement projects; and monitor affects of forest management on aquatic resources.

FISHERIES HYDROACOUSTIC ASSESSMENT TECHNIQUES

Contact Person:

Lisa Gonnason
Biosonics, Inc.
3670 Stone Way N.
Seattle, WA 98103
(206) 634-0123

Audience Designed For: Past course participants have included fisheries scientists, environmental consultants, hydropower relicensing managers, administrators, and field technicians.

Length: 5 days

Dates: October 22-26, 1990 and January 14-18, 1991

Location: Seattle, WA

Cost: $900 payable in advance. It includes tuition and all course materials.

A 20% discount is available for a company or agency group of three or more persons.

Course Description: This intensive course focuses on the use of hydroacoustics for data collection and data processing. It provides an excellent opportunity to learn about and apply the latest techniques and instrumentation for hydroacoustic fisheries resource assessment and management. The course includes lectures, laboratory demonstration, and a field survey--all with an emphasis on teaching specific skills through hands-on experience.

USING HYDROACOUSTICS TO OBTAIN INFORMATION ABOUT FISH POPULATIONS

Contact Person:
Lisa Gonnason
Biosonics, Inc.
3670 Stone Way N.
Seattle, WA 98103
(206) 634-0123

Audience Designed For: Past course participants have included fisheries scientists, environmental consultants, hydropower relicensing managers, administrators, and field technicians.

Length: 3 days

Dates: June 12-14, 1990 and early December

Location: Howard Johnson Lodge, Wausau, WI

Cost: $600 payable in advance. It includes tuition and all course materials. A 20% discount is available for a company or agency group of three or more persons.

Course Description: This course focuses on the use of hydroacoustics for data collection and data processing. It provides an excellent opportunity to learn about the latest techniques and instrumentation for hydroacoustic fisheries resource assessment and management. The course includes lectures, equipment demonstrations, and laboratory exercises.

ADVANCED ECHO SIGNAL PROCESSING: OPERATION OF THE BIOSONICS ESP

Contact Person:
Lisa Gonnason
Biosonics, Inc.
3670 Stone Way N.
Seattle, WA 98103
(206) 634-0123

Audience Designed For: The course is recommended for ESP owners and other experienced fisheries acousticians who have used scientific fisheries acoustics gear or have attended BioSonics' week-long "Fisheries Hydroacoustics Assessment Techniques (FHAT)" course. Computer literacy is assumed, especially familiarity with Microsoft Windows ™ and MS-DOS.

The AESP course does not cover hydroacoustic theory, survey design, or data acquisition techniques; these and other such topics are included in the FHAT course.

Length: 2 days

Dates: October 30-31, 1990 and January 22-23, 1991

Location: Seattle, WA

Cost: $500 payable in advance. It includes tuition and all course materials. A 20% discount is available for a company or agency groups of three or more persons.

Course Description: The overall objective of this two day course is that participants become familiar with all operational aspects of the BioSonics Echo Signal Processor (ESP).

AQUACULTURE ENGINEERING
(conditional upon sufficient interest)

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Fish culturists and interested persons.

Length: 3 or 4 days

Date: Tentatively Spring 1991

Location: Clyde, NC

Cost: $15.00

Course Description: The course will include various engineering aspects of fish culture systems, such as design and construction, pumps, oxygen, aeration, filtration, disinfection, and waste management.

PROFITABLE UTILIZATION OF AQUACULTURE BYPRODUCTS
(conditional upon sufficient interest)

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Aquaculturists and interested persons.

Length: 3 or 4 days

Date: Tentatively Spring 1991

Location: Clyde, NC

Cost: $15.00

Course Description: Instruction will focus on cleaning up freshwater aquaculture effluent and processing wastes by profitable income-producing methods.

CAGE AND NET-PEN CULTURE
(conditional upon sufficient interest)

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Fish farmers and interested persons.

Length: 3 or 4 days

Date: Tentatively Spring 1991

Location: Clyde, NC

Cost: $15.00

Course Description: The course will focus on the commercial cage and net-pen culture of fish in ponds, lakes, and abandoned quarries.

TILAPIA CULTURE

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: People interested in producing tilapia commercially.

Length: 3 or 4 days

Date: Tentatively Summer 1991
Location: Clyde, NC

Cost: $15.00

Course Description: The course is designed to give a broad range of basic information needed to profitably produce tilapia for the commercial market. Spawning, care of eggs, management at all stages of growth, nutrition, feeding, economics, and marketing will be included.

COMPUTERS IN FISH CULTURE

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Fish producers and interested persons.

Length: 3 or 4 days

Date: Spring or Summer 1991

Location: Clyde, NC

Cost: $15.00

Course Description: Instruction will focus on the practical utilization of computers in all phases of production and management of a fish farm.

HYDROPONICS IN FISH CULTURE
(conditional on sufficient interest)

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Fish culturists.

Length: 3 or 4 days

Date: Tentatively Spring 1991

Location: Clyde, NC

Cost: $15.00

Course Description: Instruction will focus on the utilization of the nutrient-rich water and solids from fish production in the commerical production of plants. Using plants as a bio-filter in fish culture systems will be emphasized.

STARTING IN TROUT FARMING

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Potential trout farmers.

Length: 4 days

Date: April or May 1991

Location: Clyde, NC

Cost: $15.00

Course Description: This course will give potential trout farmers information needed to get started. Assistance available, economics, markets, and construction of concrete and earthen systems will be included.

FISH HEALTH MANAGEMENT

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Trout culturists and hatchery workers.

Length: 5 days

Date: Tentatively February or March 1991

Location: Clyde, NC

Cost: $15.00

Course Description: The central theme will be the early recognition of fish health problems and how to cope with them at all stages of fish growth. Lab sessions will emphasize basic examination of fish for specific problems.

TROUT CULTURE

Contact Person:
Charles W. Johnson
Fishery Training Specialist
HCC, Freedlander Drive
Clyde, NC 28721
(704) 627-2821

Audience Designed For: Trout culturists and hatchery workers.

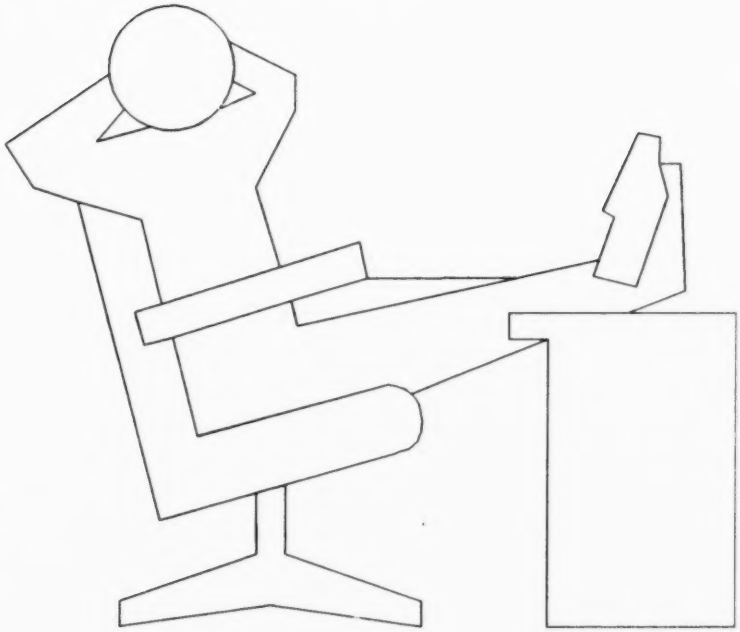
Length: 4 days

Date: Tentatively January or February 1991

Location: Clyde, NC

Cost: $15.00

Course Description: The course will provide information needed for trout culturists and hatchery workers to have an efficient operation. Hatching, hatchery management, production methods, transportation, nutrition, feeding and water quality will be included.



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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Fisheries Academy
Rt. 3, Box 49
Kearneysville, WV 25430

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